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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/080,728	02/22/2002	Brian C. Banister	LSI-006-CIP	8379

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EXAMINER	
BURD, KEVIN MICHAEL	

ART UNIT	PAPER NUMBER
2611	

DATE MAILED: 05/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/080,728	BANISTER, BRIAN C.	
	Examiner	Art Unit	
	Kevin M. Burd	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 February 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-45* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,14,15,25-33,36-43 and 45* is/are rejected.

7)☒ Claim(s) *8-13,16-24,34,35 and 44* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 February 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

1. This action, in response to the amendment and remarks filed 2/17/2006, is a non-final office action.

Response to Arguments

2. The drawings were received on 2/17/2006. These drawings are acceptable.

3. The previous rejection of the claims under 35 USC 112, second paragraph is withdrawn.

4. Applicant's arguments filed 2/17/2006 have been fully considered but they are not persuasive. Applicant states Harrison does not teach "perturbation vectors". The examiner disagrees. Harrison discloses the output of the channel estimator 204 is a group of vectors that describe the impulse response of channels between each base transceiver antenna element and subscriber antenna 201 (column 6, lines 41-46). The vector is input to the weight estimator 602 that generates the weight vector (figure 6). The weight estimator comprises a sample channel autocorrelation matrix computer 270 (figure 210).

5. New rejections rejecting claims 7, 14, 15, 33, 36, 43 and 45 are stated below.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the

applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-6, 25-32 and 37-42 are rejected under 35 U.S.C. 102(e) as being anticipated by Harrison et al (US 6,434,366).

Regarding claim 1, 31, 37 and 41, Harrison discloses an apparatus and a method of estimating adaptive array weights used to transmit a signal to a receiver in a wireless communication system. The transceiver is shown in figure 5. A channel autocorrelation matrix is determined (column 4, lines 38-67). When a single weight is used per element, the set of weights may also be referred to as a "weight vector" (column 4, lines 12-14). Feedback from the receiver is input to the weight computer 306 in figure 5 and these weights are used to deliver the maximum power according to the correct autocorrelation matrix (column 4, lines 38-67). Harrison discloses the output of the channel estimator 204 is a group of vectors that describe the impulse response of channels between each base transceiver antenna element and subscriber antenna 201 (column 6, lines 41-46). The vector is input to the weight estimator 602 that generates the weight vector (figure 6). The weight estimator comprises a sample channel autocorrelation matrix computer 270 (figure 210).

Regarding claims 2, 4-6, 32 and 42, the matrix A is generated according to the auto correlation matrix as stated in column 4, lines 38-67. The transmitted signal will be received at the receiver (subscriber unit). The subscriber unit will transmit transmitter control data to adapt the weights in the transmitter (column 4, lines 9-37). Harrison discloses the output of the channel estimator 204 is a group of vectors that describe the

impulse response of channels between each base transceiver antenna element and subscriber antenna 201 (column 6, lines 41-46). The vector is input to the weight estimator 602 that generates the weight vector (figure 6). The weight estimator comprises a sample channel autocorrelation matrix computer 270 (figure 210).

Regarding claim 3, the communication system is a CDMA system (column 3, lines 39-42).

Regarding claims 25-30, Harrison further discloses the transmitter control data provides the base transceiver information necessary to modify the traffic channel signals in a way that enhances the gain of the antenna array for the particular location of the subscriber units (column 4, lines 1-5).

Regarding claims 38-40, the transmitting antennae are connected as shown in figure 5.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 7, 14, 15, 33, 36, 43 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harrison et al (US 6,434,366) in view of Oler et al (US 6,031,866).

Regarding claims 7, 33, and 43, Harrison discloses an apparatus and a method of estimating adaptive array weights used to transmit a signal to a receiver in a wireless

communication system. The transceiver is shown in figure 5. A channel autocorrelation matrix is determined (column 4, lines 38-67). When a single weight is used per element, the set of weights may also be referred to as a "weight vector" (column 4, lines 12-14). Feedback from the receiver is input to the weight computer 306 in figure 5 and these weights are used to deliver the maximum power according to the correct autocorrelation matrix (column 4, lines 38-67). Harrison discloses the output of the channel estimator 204 is a group of vectors that describe the impulse response of channels between each base transceiver antenna element and subscriber antenna 201 (column 6, lines 41-46). The vector is input to the weight estimator 602 that generates the weight vector (figure 6). The weight estimator comprises a sample channel autocorrelation matrix computer 270 (figure 210). Harrison does not disclose calculating a reverse channel autocorrelation matrix in the disclosed base station transceiver. Oler discloses the duplex base station in figure 1. The base station comprises channel estimators for estimating the forward and reverse links and according to this system, it is preferred that the reverse link and forward link training sequences have a diagonal autocorrelation matrix (column 8, lines 25-30). It would have been obvious for one of ordinary skill in the art at the time of the invention to incorporate the teachings of Oler into the method and apparatus of Harrison. Oler discloses an asymmetric system will typically employ pre-equalization in the forward link and post-equalization in the reverse link (column 3, lines 8-13) and it is advantageous to reduce the computational complexity required for equalization at the portable transceiver by determining the equalization parameters for the portable with a computationally efficient channel estimation algorithm that exploits

the advantageous autocorrelation properties of specific training sequences (column 3, lines 17-25).

Regarding claim 14, Harrison discloses an apparatus and a method of estimating adaptive array weights used to transmit a signal to a receiver in a wireless communication system. The transceiver is shown in figure 5. A channel autocorrelation matrix is determined (column 4, lines 38-67). When a single weight is used per element, the set of weights may also be referred to as a "weight vector" (column 4, lines 12-14). Feedback from the receiver is input to the weight computer 306 in figure 5 and these weights are used to deliver the maximum power according to the correct autocorrelation matrix (column 4, lines 38-67). Harrison discloses the output of the channel estimator 204 is a group of vectors that describe the impulse response of channels between each base transceiver antenna element and subscriber antenna 201 (column 6, lines 41-46). The vector is input to the weight estimator 602 that generates the weight vector (figure 6). The weight estimator comprises a sample channel autocorrelation matrix computer 270 (figure 210). The matrix A is generated according to the auto correlation matrix as stated in column 4, lines 38-67. The transmitted signal will be received at the receiver (subscriber unit). The subscriber unit will transmit transmitter control data to adapt the weights in the transmitter (column 4, lines 9-37). Harrison does not disclose calculating a reverse channel autocorrelation matrix in the disclosed base station transceiver. Oler discloses the duplex base station in figure 1. The base station comprises channel estimators for estimating the forward and reverse links and according to this system, it is preferred that the reverse link and forward link training sequences have a diagonal

autocorrelation matrix (column 8, lines 25-30). It would have been obvious for one of ordinary skill in the art at the time of the invention to incorporate the teachings of Oler into the method and apparatus of Harrison. Oler discloses an asymmetric system will typically employ pre-equalization in the forward link and post-equalization in the reverse link (column 3, lines 8-13) and it is advantageous to reduce the computational complexity required for equalization at the portable transceiver by determining the equalization parameters for the portable with a computationally efficient channel estimation algorithm that exploits the advantageous autocorrelation properties of specific training sequences (column 3, lines 17-25).

Regarding claims 36 and 45, Harrison further discloses the apparatus capable of calculating the autocorrelation matrix using eigenvectors and eigenvalues (column 7, line 66 to column 8, line 5).

Allowable Subject Matter

8. Claims 8-13, 16-24, 34, 35 and 44 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M. Burd whose telephone number is (571) 272-3008. The examiner can normally be reached on Monday - Friday 9 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on (571) 272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kevin M. Burd
4/27/2006

KEVIN BURD
PRIMARY EXAMINER